

(TUE) JUN 27 20

RECEIVED**EXHIBIT B-1**

JUN 28 2006
1C-06-06-1608
Ravalli County Planning Dept.

Ben,

I am faxing some information for the planning board on Aspen Springs. I will email more tomorrow plus an explanation of these charts.

Candi Jester

30 pages
with this
one

6/29/06

Called Candi - told her ^{all} the copies did not come out clearly. She said she would mail down new color maps & legends today, they should be here by Friday, June 30. She also said that she will email more information soon.

*Soil Survey of
Missoula County
Area, Missoula
Part II Nov., 1995*

123

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building-site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for onsite investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils are included within the mapped areas of a specific site.

Information is not site specific and does not replace the need for onsite investigation of the soils or their analysis by personnel experienced in the construction of engineering works.

Local ordinances and regulations that restrict uses or impose specific design criteria were used in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design. Soil properties and site features, and observed soil characteristics, were considered in determining the ratings.

During the fieldwork for this soil survey, measurements were made about grain-size distribution, plasticity index, soil reaction, depth to bedrock within 5 or 6 feet of the surface, depth to a seasonal high water table, likelihood of flooding, natural soil structure, and soil density. Data were collected about minerals, mineralogy of the sand and silt fractions, and kinds of adsorbed cations. Estimates of solubility, permeability, corrosivity, available water capacity, and characteristics affecting engineering

uses can be used to evaluate the potential for residential, commercial, industrial,

and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the "Glossary."

Building Site Development

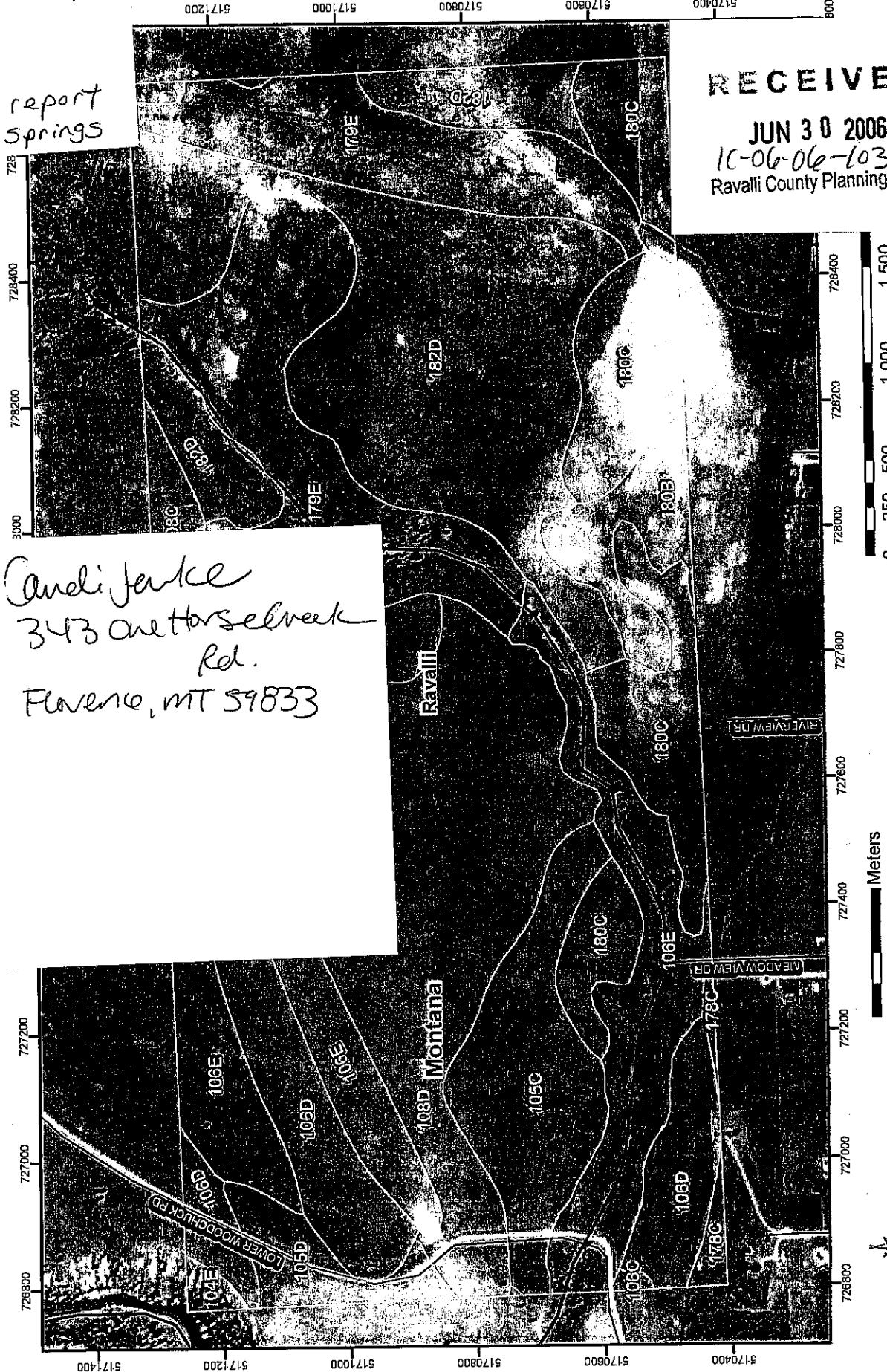
The table "Building Site Development" shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging,

SOIL SURVEY OF BITTERROOT VALLEY AREA, MONTANA

for Appendix

FCIAS report
for Aspen Springs



RECEIVED

JUN 30 2006
1C-06-06-1036
Ravalli County Planning Dept.

Web Soil Survey 1.1
National Cooperative Soil Survey

USDA Natural Resources
Conservation Service

Map Unit Legend Summary

Bitterroot Valley Area, Montana

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|-----------------|--|--------------|----------------|
| 104E | Farnuf-Bitterroot-Subwell complex, 15 to 40 percent slopes | 1.3 | 0.3 |
| 105C | Riverside-Losttrail complex, 4 to 8 percent slopes | 23.5 | 5.7 |
| 105D | Riverside-Losttrail complex, 8 to 15 percent slopes | 7.7 | 1.8 |
| 106C | Riverside cobbly sandy loam, 4 to 8 percent slopes | 2.6 | 0.6 |
| 106D | Riverside cobbly sandy loam, 8 to 15 percent slopes | 28.8 | 6.9 |
| 106E | Riverside cobbly sandy loam, 15 to 35 percent slopes | 60.7 | 14.6 |
| 108C | Riverside gravelly sandy loam, 4 to 8 percent slopes | 4.4 | 1.1 |
| 108D | Riverside gravelly sandy loam, 8 to 15 percent slopes | 70.6 | 16.9 |
| 178C | Lolo cobbly loam, 4 to 8 percent slopes | 2.1 | 0.5 |
| 179E | Perma-Riverside complex, 15 to 35 percent slopes | 82.7 | 19.9 |
| 180B | Farnuf-Haccke complex, 0 to 4 percent slopes | 10.6 | 2.5 |
| 180C | Farnuf-Haccke complex, 4 to 8 percent slopes | 40.6 | 9.7 |
| 182D | Quast-Haccke complex, 8 to 15 percent slopes | 80.8 | 19.4 |

*Not in
area*

416.4 acres

SOIL SURVEY OF BITTERROOT VALLEY AREA, MONTANA



Map Unit Legend Summary

Bitterroot Valley Area, Montana

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI | |
|-----------------|--|--------------|----------------|--------------------|
| 11A | Riverrun-Canarway-Fredburr complex, 0 to 2 percent slopes | 0.0 | 0.0 | <i>Not in area</i> |
| 104E | Farnuf-Bitterroot-Subwell complex, 15 to 40 percent slopes | 2.1 | 0.6 | |
| 105C | Riverside-Losttrail complex, 4 to 8 percent slopes | 23.6 | 6.6 | |
| 105D | Riverside-Losttrail complex, 8 to 15 percent slopes | 8.1 | 2.3 | |
| 106C | Riverside cobbly sandy loam, 4 to 8 percent slopes | 3.9 | 1.1 | |
| 106D | Riverside cobbly sandy loam, 8 to 15 percent slopes | 21.5 | 6.0 | |
| 106E | Riverside cobbly sandy loam, 15 to 35 percent slopes | 52.3 | 14.7 | |
| 108C | Riverside gravelly sandy loam, 4 to 8 percent slopes | 6.4 | 1.8 | |
| 108D | Riverside gravelly sandy loam, 8 to 15 percent slopes | 70.7 | 19.9 | |
| 179E | Perma-Riverside complex, 15 to 35 percent slopes | 77.0 | 21.7 | |
| 180B | Farnuf-Haccke complex, 0 to 4 percent slopes | 3.3 | 0.9 | |
| 180C | Farnuf-Haccke complex, 4 to 8 percent slopes | 11.0 | 3.1 | |
| 182D | Quast-Haccke complex, 8 to 15 percent slopes | 75.7 | 21.3 | |

355.6 acres

Taxonomic Classification of the Soils

Bitterroot Valley Area, Montana

| Soil name | Family or higher taxonomic classification |
|------------|---|
| Bitterroot | Coarse-loamy, mixed, superactive, frigid Haploduric Durustolls |
| Canarway | Sandy-skeletal, mixed, frigid Aeric Fluvaquents |
| Famul | Fine-loamy, mixed, superactive, frigid Typic Argiaquolls |
| Fredburr | Sandy, mixed, frigid Oxyaque Ustifluvents |
| Hedcke | Fine-loamy, mixed, superactive, frigid Typic Natrustolls |
| Lostlair | Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls |
| Perma | Loamy-skeletal, mixed, superactive, frigid Typic Haplustolls |
| Quast | Coarse-silty, mixed, superactive, frigid Typic Haplustolls |
| Rivernut | Sandy-skeletal, mixed, frigid Oxyaque Ustifluvents |
| Riverside | Sandy-skeletal, mixed, frigid Typic Haplustolls |
| Subwell | Loamy-skeletal, mixed, superactive, frigid Typic Haplustolls |

Dwellings and Small Commercial Buildings

Bitterroot Valley Area, Montana

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

| Map symbol and soil name | Pct. of map unit | Dwellings without basements | | Dwellings with basements | | Small commercial buildings | |
|----------------------------------|---------------------------|--|--------|--|-----------|--|--------|
| | | Rating class and limiting features | Value | Rating class and limiting features | Value | Rating class and limiting features | Value |
| 11A: | | | | | | | |
| Riverrun | 40 | Very limited Flooding | 1 | Very limited Flooding Depth to saturated zone | 1 0.99 | Very limited Flooding | 1 |
| Canarway, very poorly drained | 30 | Very limited Flooding Depth to saturated zone | 1 1 | Very limited Flooding Depth to saturated zone | 1 1 | Very limited Flooding Depth to saturated zone | 1 1 |
| Fredburn | 25 | Very limited Flooding | 1 | Very limited Flooding Depth to saturated zone | 1 0.99 | Very limited Flooding | 1 |
| 104E: | | | | | | | |
| Famul | 50 | Very limited Slope | 1 | Very limited Slope | 1 | Very limited Slope | 1 |
| Bitterroot | 20 | Very limited Slope | 1 | Very limited Slope Depth to thin cemented pan | 1 0.84 | Very limited Slope | 1 |
| Subwell | 20 | Very limited Slope | 1 | Very limited Slope | 1 | Very limited Slope | 1 |
| 105C: | | | | | | | |
| Riverside | 50 | Not limited | | Not limited | | Somewhat limited Slope | 0.5 |
| Losttrail | 30 | Not limited | | Not limited | | Somewhat limited Slope | 0.5 |
| 105D: | | | | | | | |
| Riverside | 50 | Somewhat limited Slope | 0.5 | Somewhat limited Slope | 0.5 | Very limited Slope | 1 |
| Losttrail | 30 | Somewhat limited Slope | 0.5 | Somewhat limited Slope | 0.5 | Very limited Slope | 1 |

Dwellings and Small Commercial Buildings

Bitterroot Valley Area, Montana

| Map symbol and soil name | Pct. of map unit | Dwellings without basements | | Dwellings with basements | | Small commercial buildings | |
|-----------------------------|---------------------------|---|-----------|---|-----------|---|-------------|
| | | Rating class and limiting features | Value | Rating class and limiting features | Value | Rating class and limiting features | Value |
| 106C: Riverside | 85 | Not limited Slope | 1 | Not limited Slope | 1 | Somewhat limited Slope | 0.5 |
| 106D: Riverside | 85 | Somewhat limited Slope | 0.5 | Somewhat limited Slope | 0.5 | Very limited Slope | 1 |
| 106E: Riverside | 85 | Very limited Slope | 1 | Very limited Slope | 1 | Very limited Slope | 1 |
| 108C: Riverside | 85 | Not limited Slope | 1 | Not limited Slope | 1 | Somewhat limited Slope | 0.5 |
| 108D: Riverside | 85 | Somewhat limited Slope | 0.5 | Somewhat limited Slope | 0.5 | Very limited Slope | 1 |
| 170E: Perma | 55 | Very limited Slope Large stones content | 1 0.01 | Very limited Slope Large stones content | 1 0.01 | Very limited Slope Large stones content | 1 0.01 |
| Riverside | 35 | Very limited Slope | 1 | Very limited Slope | 1 | Very limited Slope | 1 |
| 180B: Famuf | 65 | Not limited | | Not limited | | Not limited | |
| Heccke | 15 | Somewhat limited Shrink-swell | 0.01 | Not limited | | Somewhat limited Shrink-swell | 0.01 |
| 180C: Famuf | 65 | Not limited | | Not limited | | Somewhat limited Slope | 0.5 |
| Heccke | 15 | Somewhat limited Shrink-swell | 0.01 | Not limited | | Somewhat limited Slope Shrink-swell | 0.5 0.01 |
| 182D: Quast | 70 | Somewhat limited Slope | 0.5 | Somewhat limited Slope | 0.5 | Very limited Slope | 1 |

Dwellings and Small Commercial Buildings

Bitterroot Valley Area, Montana

| Map symbol and coll name | Pct. of map unit | Dwellings without basements | | Dwellings with basements | | Small commercial buildings | |
|-----------------------------|---------------------------|---|-------------|---------------------------------------|-------|---------------------------------------|-----------|
| | | Rating class and limiting features | Value | Rating class and limiting features | Value | Rating class and limiting features | Value |
| 182D; Haccke | 20 | Somewhat limited Slope Shrink-swell | 0.5 0.01 | Somewhat limited Slope | 0.5 | Very limited Slope Shrink-swell | 1 0.01 |

Roads and Streets, Shallow Excavations, and Lawns and Landscaping

Bitterroot Valley Area, Montana

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations.]

| Map symbol and soil name | Pct. of map unit | Local roads and streets | | Shallow excavations | | Lawns and landscaping | |
|---------------------------------|---------------------------|--|----------|---|--------------------|---|---------------------------|
| | | Rating class and limiting features | Value | Rating class and limiting features | Value | Rating class and limiting features | Value |
| 11A: Riverrun | 40 | Very limited Flooding | 1 | Very limited Cutbanks cave Depth to saturated zone Flooding | 0.1 0.99 0.6 | Very limited Droughty Flooding Large stones content | 0.1 0.6 0.01 |
| Canaway, very poorly drained | 30 | Very limited Depth to saturated zone Flooding Frost action | 1 0.5 | Very limited Depth to saturated zone Cutbanks cave Flooding | 1 1 0.6 | Not rated | |
| Fredburn | 25 | Very limited Flooding Frost action | 1 0.5 | Very limited Cutbanks cave Depth to saturated zone Flooding | 0.1 0.99 0.6 | Somewhat limited Droughty Flooding Large stones content | 0.09 0.6 0.01 |
| 104E: Farmuf | 50 | Very limited Slope Frost action | 1 0.5 | Very limited Slope Cutbanks cave | 1 0.1 | Very limited Slope Large stones content | 1 0.01 |
| Bitterroot | 20 | Very limited Slope Frost action | 1 0.5 | Very limited Slope Cutbanks cave Depth to thin cemented pan | 1 1 0.84 | Very limited Slope Depth to cemented pan Droughty Large stones content | 1 0.84 0.12 0.01 |
| Subwell | 20 | Very limited Slope Frost action | 1 0.5 | Very limited Slope Cutbanks cave | 1 1 | Very limited Slope Large stones content Droughty | 1 0.32 0.06 |
| 105C: Riverside | 50 | Not limited | | Very limited Cutbanks cave | 1 | Somewhat limited Droughty | 0.99 |
| Losttrail | 30 | Somewhat limited Frost action | 0.5 | Very limited Cutbanks cave | 1 | Not limited | |

This report shows only the major soils in each map unit. Others may exist.

Roads and Streets, Shallow Excavations, and Lawns and Landscaping

Bitterroot Valley Area, Montana

| Map symbol and soil name | Pct. of map unit | Local roads and streets | | Shallow excavations | | Lawns and landscaping | |
|-----------------------------|---------------------------|---|------------------|--|----------------|---|--------------------------|
| | | Rating class and limiting features | Value | Rating class and limiting features | Value | Rating class and limiting features | Value |
| 105D: | | | | | | | |
| Riverside | 50 | Somewhat limited Slope | 0.5 | Very limited Cutbanks cave Slope | 1 0.5 | Somewhat limited Droughty Slope | 0.99 0.5 |
| Losttrail | 30 | Somewhat limited Slope Frost action | 0.5 0.5 | Very limited Cutbanks cave Slope | 1 0.5 | Somewhat limited Slope | 0.5 |
| 106C: | | | | | | | |
| Riverside | 85 | Not limited | | Very limited Cutbanks cave | 1 | Very limited Droughty Large stones content | 1 0.92 |
| 106D: | | | | | | | |
| Riverside | 85 | Somewhat limited Slope | 0.5 | Very limited Cutbanks cave Slope | 1 0.5 | Very limited Droughty Large stones content Slope | 1 0.92 0.5 |
| 106E: | | | | | | | |
| Riverside | 85 | Very limited Slope | 1 | Very limited Slope Cutbanks cave | 1 1 | Very limited Slope Droughty Large stones content | 1 1 0.92 |
| 108C: | | | | | | | |
| Riverside | 85 | Not limited | | Very limited Cutbanks cave | 1 | Very limited Droughty Gravel content Large stones content | 1 0.41 0.05 |
| 108D: | | | | | | | |
| Riverside | 85 | Somewhat limited Slope | 0.5 | Very limited Cutbanks cave Slope | 1 0.5 | Very limited Droughty Slope Gravel content Large stones content | 1 0.5 0.41 0.05 |
| 179E: | | | | | | | |
| Perma | 55 | Very limited Slope Frost action Large stones content | 1 0.5 0.01 | Very limited Slope Cutbanks cave Large stones content | 1 1 0.01 | Very limited Slope Large stones content Droughty | 1 0.84 0.67 |

Roads and Streets, Shallow Excavations, and Lawns and Landscaping

Bitterroot Valley Area, Montana

| Map symbol and toll name | Pct. of map unit | Local roads and streets | | Shallow excavations | | Lawns and landscaping | |
|-----------------------------|---------------------------|---|-------------------------|--|------------|---|------------------|
| | | Rating class and limiting features | Value | Rating class and limiting features | Value | Rating class and limiting features | Value |
| 170E: Riverside | 35 | Very limited Slope | 1 | Very limited Slope Cutbanks cave | 1 1 | Very limited Slope Droughly Large stones content | 1 1 0.92 |
| 180B: Farmuf | 85 | Somewhat limited Frost action | 0.5 | Somewhat limited Cutbanks cave | 0.1 | Somewhat limited Large stones content | 0.01 |
| Haccke | 15 | Very limited Low strength Frost action Shrink-swell | 1 0.5 0.01 | Somewhat limited Cutbanks cave | 0.1 | Very limited Sodium content Large stones content | 1 0.01 |
| 180C: Farmuf | 85 | Somewhat limited Frost action | 0.5 | Somewhat limited Cutbanks cave | 0.1 | Somewhat limited Large stones content | 0.01 |
| Haccke | 15 | Very limited Low strength Frost action Shrink-swell | 1 0.5 0.01 | Somewhat limited Cutbanks cave | 0.1 | Very limited Sodium content Large stones content | 1 0.01 |
| 182D: Quest, | 70 | Somewhat limited Low strength Slope Frost action | 0.78 0.5 0.5 | Somewhat limited Slope Cutbanks cave | 0.5 0.1 | Somewhat limited Slope Large stones content | 0.5 0.08 |
| Haccke | 20 | Very limited Low strength Slope Frost action Shrink-swell | 1 0.5 0.5 0.01 | Somewhat limited Slope Cutbanks cave | 0.5 0.1 | Very limited Sodium content Slope Large stones content | 1 0.5 0.01 |

Sewage Disposal

Bitterroot Valley Area, Montana

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations.]

| Map symbol and soil name | Pct. of map unit | Septic tank absorption fields | | Sewage lagoons | |
|----------------------------------|---------------------------|---|-----------------------|--|------------------|
| | | Rating class and limiting features | Value | Rating class and limiting features | Value |
| 11A: Riverrun | 40 | Very limited Flooding Depth to saturated zone Filtering capacity Seepage | 1 1 1 1 1 | Very limited Flooding Seepage Depth to saturated zone | 1 1 1 1 |
| Canarway, very poorly drained | 30 | Very limited Flooding Depth to saturated zone Filtering capacity Seepage | 1 1 1 1 | Very limited Flooding Seepage Depth to saturated zone Organic matter content | 1 1 1 1 |
| Fredburn | 25 | Very limited Flooding Depth to saturated zone Filtering capacity Seepage | 1 1 1 1 | Very limited Flooding Seepage Depth to saturated zone | 1 1 1 |
| 104E: Fernduf | 50 | Very limited Slope Seepage Slow water movement | 1 1 0.5 | Very limited Slope Seepage | 1 1 |
| Bitterroot | 20 | Very limited Depth to cemented pan Slope Seepage | 1 1 1 | Very limited Depth to cemented pan Slope Seepage | 1 1 1 |
| Subwell | 20 | Very limited Slope Seepage | 1 1 | Very limited Slope Seepage | 1 1 |
| 105C: Riverside | 50 | Very limited Seepage Filtering capacity | 1 1 | Very limited Seepage Slope | 1 0.92 |

Sewage Disposal

Bitterroot Valley Area, Montana

| Map symbol and soil name | Pct. of map unit | Septic tank absorption fields | | Sewage lagoons | |
|-----------------------------|---------------------------|--|---------------|--|-------------------|
| | | Rating class and limiting features | Value | Rating class and limiting features | Value |
| 105C: Losttrail | 30 | Very limited Seepage | 1 | Very limited Seepage Slope | 1 0.92 |
| 105D: Riverside | .50 | Very limited Seepage Filtering capacity Slope | 1 1 0.5 | Very limited Slope Seepage | 1 1 |
| Losttrail | 30 | Very limited Seepage Slope | 1 0.5 | Very limited Slope Seepage | 1 1 |
| 106C: Riverside | .85 | Very limited Seepage Filtering capacity | 1 1 | Very limited Seepage Slope Large stones content | 1 0.92 0.01 |
| 106D: Riverside | .85 | Very limited Seepage Filtering capacity Slope | 1 1 0.5 | Very limited Slope Seepage Large stones content | 1 1 0.01 |
| 106E: Riverside | .85 | Very limited Slope Seepage Filtering capacity | 1 1 1 | Very limited Slope Seepage Large stones content | 1 1 0.01 |
| 108C: Riverside | .85 | Very limited Seepage Filtering capacity | 1 1 | Very limited Seepage Slope | 1 0.92 |
| 108D: Riverside | .85 | Very limited Seepage Filtering capacity Slope | 1 1 0.5 | Very limited Slope Seepage | 1 1 |

Sewage Disposal

Bitterroot Valley Area, Montana

| Map symbol and soil name | Pct. of map unit | Septic tank absorption fields | | Sewage lagoons | |
|-----------------------------|---------------------------|--|----------------------|--|---------------------|
| | | Rating class and limiting features | Value | Rating class and limiting features | Value |
| 170E: | | | | | |
| Perma | 55 | Very limited Slope Seepage Large stones content | 1 1 1 0.01 | Very limited Slope Seepage Large stones content | 1 1 1 0.01 |
| Riverside | 35 | Very limited Slope Seepage Filtering capacity | 1 1 1 1 | Very limited Slope Seepage Large stones content | 1 1 0.01 |
| 180B: | | | | | |
| Farnuf | 65 | Very limited Seepage Slow water movement | 1 1 0.5 | Very limited Seepage Slope | 1 1 0.92 |
| Haccke | 15 | Somewhat limited Slow water movement | 0.72 | Somewhat limited Seepage | 0.5 |
| 180C: | | | | | |
| Farnuf | 65 | Very limited Seepage Slow water movement | 1 1 0.5 | Very limited Seepage Slope | 1 1 0.92 |
| Haccke | 15 | Somewhat limited Slow water movement | 0.72 | Somewhat limited Slope Seepage | 0.92 0.5 |
| 182D: | | | | | |
| Quast | 70 | Very limited Seepage Slope Slow water movement | 1 1 0.5 0.5 | Very limited Slope Seepage | 1 1 |
| Haccke | 20 | Somewhat limited Slow water movement Slope | 0.72 0.5 | Very limited Slope Seepage | 1 0.5 |

Component Legend

Bitterroot Valley Area, Montana

| Map unit symbol and name | Pct. of map unit | Component name | Component kind | Pct. slope | | |
|--|------------------|----------------------------------|----------------|------------|------|------|
| | | | | Low | RV | High |
| 14A: Rivemun-Canarway-Fredbur complex, 0 to 2 percent slopes | 40 | Rivemun | Series | 0 | 1 | 2 |
| | 30 | Canarway, very poorly drained | Series | 0 | 1 | 2 |
| | 25 | Fredbur | Series | 0 | 1 | 2 |
| 104E: Farmuf-Bitterroot-Subwell complex, 15 to 40 percent slopes | 50 | Farmuf | Series | 15 | 28 | 40 |
| | 20 | Bitterroot | Series | 15 | 28 | 40 |
| | 20 | Subwell | Series | 15 | 28 | 40 |
| 105C: Riverside-Losttrail complex, 4 to 8 percent slopes | 50 | Riverside | Series | 4 | 6 | 8 |
| | 30 | Losttrail | Series | 4 | 6 | 8 |
| 105D: Riverside-Losttrail complex, 8 to 15 percent slopes | 50 | Riverside | Series | 8 | 11.5 | 15 |
| | 30 | Losttrail | Series | 8 | 11.5 | 15 |
| 106C: Riverside cobbly sandy loam, 4 to 8 percent slopes | 85 | Riverside | Series | 4 | 6 | 8 |
| 106D: Riverside cobbly sandy loam, 8 to 15 percent slopes | 85 | Riverside | Series | 8 | 11.5 | 15 |
| 106E: Riverside cobbly sandy loam, 15 to 35 percent slopes | 85 | Riverside | Series | 15 | 25 | 35 |

This report shows only the major soils in each map unit. Others may exist.

Component Legend

Billings Valley Area, Montana

| Map unit symbol and name | Pct. of map unit | Component name | Component kind | Pct. slope | | |
|--|------------------|----------------|----------------|------------|------|------|
| | | | | Low | RV | High |
| 108C: Riverside gravelly sandy loam, 4 to 8 percent slopes | 85 | Riverside | Series | 4 | 6 | 8 |
| 108D: Riverside gravelly sandy loam, 8 to 15 percent slopes | 85 | Riverside | Series | 8 | 11.5 | 15 |
| 179E: Perma-Riverside complex, 15 to 35 percent slopes | 55 | Perma | Series | 15 | 25 | 35 |
| | 35 | Riverside | Series | 15 | 25 | 35 |
| 180B: Farmuf-Haccke complex, 0 to 4 percent slopes | 65 | Farmuf | Series | 0 | 2 | 4 |
| | 15 | Haccke | Series | 0 | 2 | 4 |
| 180C: Farmuf-Haccke complex, 4 to 8 percent slopes | 65 | Farmuf | Series | 4 | 6 | 8 |
| | 15 | Haccke | Series | 4 | 6 | 8 |
| 182D: Quast-Haccke complex, 8 to 15 percent slopes | 70 | Quast | Series | 8 | 11.5 | 15 |
| | 20 | Haccke | Series | 8 | 11.5 | 15 |

Paths, Trails, and Golf Fairways

Bitterroot Valley Area, Montana

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations.]

| Map symbol and soil name | Pct. of map unit | Paths and trails | | Off-road motorcycle trails | | Golf fairways | |
|---------------------------------|---------------------------|---------------------------------------|-------|---------------------------------------|-------|---------------------------------------|-------|
| | | Rating class and limiting features | Value | Rating class and limiting features | Value | Rating class and limiting features | Value |
| 11A: | | | | | | | |
| Blacktop | 40 | Not limited | | Not limited | | Very limited | |
| | | | | | | Droughty | 1 |
| | | | | | | Flooding | 0.6 |
| | | | | | | Large stones content | 0.01 |
| Canaway, very poorly drained | 30 | Not rated | | Not rated | | Not rated | |
| Fredburr | 25 | Somewhat limited | | Somewhat limited | | Somewhat limited | |
| | | Too sandy | 0.32 | Too sandy | 0.32 | Droughty | 0.99 |
| | | | | | | Flooding | 0.8 |
| | | | | | | Large stones content | 0.01 |
| 104E: | | | | | | | |
| Farmu | 50 | Very limited | | Very limited | | Very limited | |
| | | Water erosion | 1 | Water erosion | 1 | Slope | 1 |
| | | Slope | 1 | Slope | 0.08 | Large stones content | 0.01 |
| Bitterroot | 20 | Very limited | | Very limited | | Very limited | |
| | | Water erosion | 1 | Water erosion | 1 | Slope | 1 |
| | | Slope | 1 | Slope | 0.08 | Depth to cemented pan | 0.84 |
| | | | | | | Droughty | 0.12 |
| | | | | | | Large stones content | 0.01 |
| Subwell | 20 | Very limited | | Somewhat limited | | Very limited | |
| | | Slope | 1 | Slope | 0.08 | Slope | 1 |
| | | | | | | Large stones content | 0.32 |
| | | | | | | Droughty | 0.08 |
| 105C: | | | | | | | |
| Riverside | 50 | Not limited | | Not limited | | Somewhat limited | |
| | | | | | | Droughty | 0.99 |
| Losttrail | 30 | Not limited | | Not limited | | Not limited | |
| 105D: | | | | | | | |
| Riverside | 50 | Not limited | | Not limited | | Somewhat limited | |
| | | | | | | Droughty | 0.99 |
| | | | | | | Slope | 0.5 |
| Losttrail | 30 | Not limited | | Not limited | | Somewhat limited | |
| | | | | | | Slope | 0.5 |

Paths, Trails, and Golf Fairways

Bitterroot Valley Area, Montana

| Map symbol and soil name | Pct. of map unit | Paths and trails | | Off-road motorcycle trails | | Golf fairways | |
|-----------------------------|---------------------------|---------------------------------------|-------|---------------------------------------|-------|---|-------------------------------|
| | | Rating class and limiting features | Value | Rating class and limiting features | Value | Rating class and limiting features | Value |
| 106C: Riverside | .85 | Not limited | | Not limited | | Very limited Droughty Large stones content | 1 0.92 |
| 106D: Riverside | .85 | Not limited | | Not limited | | Very limited Droughty Large stones content Slope | 1 0.92 0.5 |
| 106E: Riverside | .85 | Very limited Slope | 1 | Not limited | | Very limited Slope Droughty Large stones content | 1 1 0.92 |
| 108C: Riverside | .85 | Not limited | | Not limited | | Very limited Droughty Gravel content Large stones content | 1 1 0.41 0.05 |
| 108D: Riverside | .85 | Not limited | | Not limited | | Very limited Droughty Slope Gravel content Large stones content | 1 1 0.5 0.41 0.05 |
| 170E: Perma | .55 | Very limited Slope | 1 | Not limited | | Very limited Slope Large stones content Droughty | 1 0.84 0.67 |
| Riverside | .35 | Very limited Slope | 1 | Not limited | | Very limited Slope Droughty Large stones content | 1 1 0.92 |
| 180B: Farmif | .85 | Not limited | | Not limited | | Somewhat limited Large stones content | 0.01 |

Paths, Trails, and Golf Fairways

Bitterroot Valley Area, Montana

| Map symbol and soil name | Pct. of map unit | Paths and trails | | Off-road motorcycle trails | | Golf fairways | |
|-----------------------------|---------------------------|---------------------------------------|-------|---------------------------------------|-------|---------------------------------------|-------|
| | | Rating class and limiting features | Value | Rating class and limiting features | Value | Rating class and limiting features | Value |
| 180B: Haccke | 15 | Not limited | | Not limited | | Very limited | |
| | | | | | | Sodium content | 1 |
| | | | | | | Large stones content | 0.01 |
| 180C: Feruf | 65 | Not limited | | Not limited | | Somewhat limited | |
| | | | | | | Large stones content | 0.01 |
| Haccke | 15 | Not limited | | Not limited | | Very limited | |
| | | | | | | Sodium content | 1 |
| | | | | | | Large stones content | 0.01 |
| 182D: Quast | 70 | Very limited Water erosion | | Very limited Water erosion | | Somewhat limited | |
| | | | | | | Slope | 0.5 |
| | | | | | | Large stones content | 0.08 |
| Haccke | 20 | Very limited Water erosion | 1 | Very limited Water erosion | 1 | Very limited | |
| | | | | | | Sodium content | 1 |
| | | | | | | Slope | 0.5 |
| | | | | | | Large stones content | 0.01 |

Engineering Properties

Bitterroot Valley Area, Montana

| Map symbol and soil name | Depth | USDA texture | Classification | | Fragments | | Percent passing sieve number | | | | | Liquid limit | Plasticity index |
|---------------------------------|-------|---|------------------------|-----------------|---------------|----------------|------------------------------|--------|-------|-------|-------|-----------------|---------------------|
| | | | Unified | AASHTO | >10 Inches | 3-10 Inches | 4 | 10 | 40 | 200 | | | |
| 11A: Riverrun | | | | | | | | | | | | | |
| | 0-6 | Sandy loam | SC-SM, SM | A-2-4, A-4 | 0 | 0-10 | 92-100 | 85-100 | 50-70 | 25-40 | 17-25 | 1-7 | |
| | 6-16 | Gravelly loamy sand, Gravelly sand, Loamy sand | SM, SP-SM | A-1-b, A-2-4 | 0 | 0-10 | 81-97 | 80-90 | 30-86 | 3-21 | 0-18 | NP-2 | |
| | 16-60 | Very gravelly loamy coarse sand, Very gravelly sand, Extremely gravelly sand | GW, GW-GM, SP-SM | A-1-a | 0 | 10-30 | 50-72 | 15-45 | 5-25 | 0-10 | 0-17 | NP-1 | |
| Canaway, very poorly drained | 0-3 | Mucky peat | PT | A-3 | — | — | — | — | — | — | — | — | |
| | 3-7 | Fine sandy loam | SC-SM, SM | A-4 | 0 | 0-8 | 92-100 | 81-100 | 70-96 | 31-48 | 20-35 | 2-10 | |
| | 7-60 | Very cobbly sand, Very gravelly coarse sand, Very gravelly sand, Extremely gravelly sand, Extremely coarse sand, Extremely gravelly sand | SW-SM | A-1-a | 0 | 7-25 | 58-81 | 8-61 | 5-51 | 1-14 | 0-20 | NP-4 | |
| Fredburn | 0-5 | Fine sandy loam | SC-SM | A-2-4, A-4 | 0 | 0-10 | 94-100 | 85-100 | 51-70 | 25-40 | 23-28 | 8-8 | |
| | 5-28 | Loamy sand, Sand | SP-SM, SM, SW-SM | A-2-4 | 0 | 0-10 | 93-100 | 85-100 | 45-70 | 0-15 | 0-18 | NP-2 | |
| | 28-60 | Very gravelly sand Extremely gravelly sand | GW, GW-GM, SW | A-1-a | 0 | 10-30 | 50-70 | 20-60 | 10-35 | 0-7 | 0-17 | NP-1 | |

This report shows only the major soils in each map unit. Others may exist.

Engineering Properties

Bitterroot Valley Area, Montana

| Map symbol and soil name | Depth In | USDA texture | Classification | | Fragments | | Percent passing sieve number— | | | Liquid limit | Plasticity index |
|-----------------------------|-------------|---|------------------------|-----------------|---------------|----------------|-------------------------------|--------|-------|-----------------|---------------------|
| | | | Unified | AASHTO | >10 inches | 3-10 inches | 4 | 10 | 40 | | |
| 104E: Farnuf | 0-8 | Loam | CL | A-4, A-6 | 0 | 0-15 | 92-100 | 85-100 | 70-95 | 60-75 | 26-34 |
| | 8-18 | Clay loam, loam, Sandy clay loam | CL | A-6, A-7 | 0 | 0-15 | 92-100 | 85-100 | 70-95 | 45-75 | 34-44 |
| | 18-34 | Fine sandy loam, Loam | CL, SC-SM | A-4, A-6 | 0 | 0-10 | 88-100 | 80-100 | 60-80 | 35-70 | 25-34 |
| | 34-60 | Fine sandy loam, Gravelly sandy loam | SC-SM, SM | A-2-4, A-4 | 0 | 0-10 | 72-100 | 60-100 | 36-85 | 20-55 | 18-26 |
| Bitterroot | 0-8 | Loam | CL | A-4, A-6 | 0 | 0-10 | 88-100 | 85-100 | 70-95 | 60-75 | 26-34 |
| | 8-15 | Gravelly loam, Loam | CL, CL-ML, SC-SM | A-4 | 0 | 0-10 | 75-100 | 55-85 | 45-95 | 35-65 | 23-28 |
| | 15-25 | Fine sandy loam, Gravelly sandy loam | SC-SM, SM | A-2-4, A-4 | 0 | 0-10 | 73-100 | 55-85 | 35-75 | 15-55 | 18-26 |
| | 25-40 | Cemented | — | — | 0 | 0 | — | — | — | — | — |
| | 40-60 | Very gravelly fine sandy loam, Very gravelly sandy loam | GC-GM, GM, SC-SM | A-1-b, A-2-4 | 0 | 0-25 | 57-77 | 35-55 | 20-45 | 10-30 | 17-25 |
| Subwall | 0-7 | Cobbly loam | CL, SC-SM | A-4, A-6 | 0-2 | 10-25 | 86-94 | 75-87 | 60-80 | 40-60 | 28-34 |
| | 7-11 | Gravelly loam, Gravelly sandy loam | SC, SC-SM | A-4, A-6 | 0 | 0-15 | 73-88 | 55-75 | 35-75 | 20-80 | 26-34 |
| | 11-41 | Very gravelly loam, Very gravelly sandy loam | GC-GM, SC | A-1, A-2-4 | 0 | 0-25 | 55-75 | 35-55 | 25-50 | 10-40 | 21-30 |
| | 41-80 | Very gravelly loamy sand, Extremely gravelly loamy sand, Extremely gravelly sand | GW, GW-GM | A-1-a | 0 | 0-25 | 45-64 | 15-45 | 10-30 | 0-15 | 0-18 |

This report contains only the major soils in each map unit. Others may exist.

Engineering Properties

Bitterroot Valley Area, Montana

| Map symbol and soil name | Depth <i>m</i> | USDA texture | Classification | | Fragments | | Percent passing sieve number— | | | | Liquid limit | Plasticity Index |
|-----------------------------|-------------------|--|------------------------|-----------------|----------------|----------------|-------------------------------|--------|-------|-------|-----------------|---------------------|
| | | | Unified | AASHTO | > 10 Inches | 3-10 Inches | 4 | 10 | 40 | 200 | | |
| 105C: Riverside | | | | | | | Pct | Pct | | | Pct | |
| | 0-8 | Sandy loam | SC, SC-SM | A-2-4, A-4 | 0 | 4-10 | 85-100 | 80-100 | 50-70 | 25-40 | 25-30 | 7-11 |
| | 8-12 | Cobbly sandy loam, Gravely sandy loam, Very gravelly sandy loam | GM, SC-SM, SM | A-1-b, A-2 | 0 | 0-28 | 58-90 | 37-80 | 20-50 | 10-30 | 18-25 | 2-7 |
| | 12-25 | Very cobbly loamy sand, Very gravelly loamy coarse sand, Very gravelly loamy sand | GW-GM, SM-SM | A-1-a | 0 | 0-40 | 52-75 | 32-65 | 10-40 | 5-15 | 0-17 | NP-1 |
| | 25-60 | Very cobbly loamy sand, Very gravelly sand, Extremely gravelly coarse sand | GW, GW-GM | A-1-a | 0 | 0-40 | 40-68 | 12-45 | 5-25 | 1-5 | 0-16 | NP-1 |
| Lositall | | | | | | | | | | | | |
| | 0-8 | Sandy loam | SC, SC-SM | A-2-4 | 0 | 0-5 | 88-100 | 85-100 | 50-70 | 25-40 | 23-28 | 6-9 |
| | 8-20 | Loam, Sandy loam | SC | A-4, A-5 | 0 | 0-8 | 88-100 | 75-100 | 55-80 | 28-43 | 24-33 | 7-12 |
| | 20-31 | Fine sandy loam, Gravely sandy loam, Sandy loam | SC, SC-SM | A-2-4, A-4 | 0 | 0-7 | 81-100 | 68-100 | 52-82 | 28-47 | 23-32 | 7-12 |
| | 31-49 | Very gravelly loamy sand, Very gravelly sand, Very gravelly sandy loam | SC-SM | A-1-b, A-2-4 | 0 | 0-17 | 57-78 | 28-53 | 21-54 | 2-13 | 0-26 | NP-9 |
| | 49-60 | Very cobbly loamy sand, Very gravelly loamy coarse sand, Very gravelly loamy sand | GM, GW-GM, SM-SM | A-1-a | 0 | 1-27 | 50-77 | 23-63 | 17-51 | 5-18 | 0-20 | NP-3 |

This report shows only the major soils in each map unit. Others may exist.

Engineering Properties

Bitterroot Valley Area, Montana

| Map symbol and soil name | Depth <i>In</i> | USDA texture | Classification | | Fragments | | Percent passing sieve number | | | | Liquid limit | Plasticity Index |
|-----------------------------|--------------------|---|------------------------|-----------------|---------------|----------------|------------------------------|--------|-------|-------|-----------------|---------------------|
| | | | Unified | AASHTO | >10 Inches | 3-10 Inches | 4 | 10 | 40 | 200 | | |
| 105D: Riverside | 0-8 | Sandy loam | SC, SC-SM | A-24, A-4 | 0 | 0-10 | 89-100 | 89-100 | 50-70 | 25-40 | 25-30 | 7-11 |
| | 8-12 | Cobby sandy loam, Gravely sandy loam, Very gravelly sandy loam | GM, SC-SM, SM | A-1-b, A-2 | 0 | 0-28 | 58-90 | 37-60 | 20-50 | 10-30 | 18-25 | 2-7 |
| | 12-25 | Very cobby loamy sand, Very gravelly loamy coarse sand, Very gravelly loamy sand | GW-GM, SW-SM | A-1-a | 0 | 0-40 | 52-75 | 32-55 | 10-40 | 5-15 | 0-17 | NP-1 |
| | 25-60 | Very cobby loamy sand, Very gravelly sand, Extremely gravelly coarse sand | GW-GM | A-1-a | 0 | 0-40 | 40-68 | 12-45 | 5-25 | 1-5 | 0-16 | NP-1 |
| Lodestar | 0-8 | Sandy loam | SC, SC-SM | A-2-4 | 0 | 0-5 | 88-100 | 85-100 | 50-70 | 25-40 | 23-28 | 6-9 |
| | 8-23 | Loam, Sandy loam | SC | A-4, A-6 | 0 | 0-8 | 88-100 | 75-100 | 58-80 | 28-43 | 24-33 | 7-12 |
| | 20-31 | Fine sandy loam, Gravely sandy loam, Sandy loam | SC, SC-SM | A-2-4, A-4 | 0 | 0-7 | 81-100 | 68-100 | 52-82 | 28-47 | 23-32 | 7-12 |
| | 31-49 | Very gravelly loamy sand, Very gravelly sand, Very gravelly sandy loam | SC-SM | A-1-b, A-2-4 | 0 | 0-17 | 57-78 | 28-63 | 21-54 | 2-13 | 0-26 | NP-9 |
| | 49-60 | Very cobby loamy sand, Very gravelly loamy coarse sand, Very gravelly loamy sand | GM, GW-GM, SW-SM | A-1-a | 0 | 1-27 | 50-77 | 23-63 | 17-51 | 5-18 | 0-20 | NP-3 |

This report shows only the major soils in each map unit. Others may exist.

Engineering Properties

Bitterroot Valley Area, Montana

| Map symbol and soil name | Depth | USDA texture | Classification | | Fragments | | Percent passing sieve number - | | | | Liquid limit | Plasticity index |
|-----------------------------|-----------|--|---------------------------|---------------|----------------|----------------|--------------------------------|-------|-------|-------|--------------|------------------|
| | | | Unified | AASHTO | > 10 Inches | 3-10 Inches | 4 | 10 | 40 | 200 | | |
| 106C: Riverside | In | | | | Pct | Pct | | | | | Pct | |
| | 0-7 | Cobbly sandy loam | CL-ML, SC-SM | A-4 | 0 | 15-30 | 84-94 | 70-80 | 55-75 | 30-60 | 23-28 | 4-9 |
| | 7-12 | Cobbly sandy loam, Gravely sandy loam, Very gravely sandy loam | GM, SC-SM, SM | A-1-b, A-2 | 0 | 0-28 | 58-60 | 37-40 | 20-50 | 10-30 | 18-25 | 2-7 |
| | 12-25 | Very cobbly loamy sand. Very gravelly loamy coarse sand, very gravelly loamy sand | GM-GM, SM-SM, SW-SM | A-1-a | 0 | 0-40 | 52-75 | 32-55 | 10-40 | 5-15 | 0-17 | NP-1 |
| | 25-60 | Very cobbly loamy sand, Very gravelly sand, Extremely gravelly coarse sand | GW, GW-GM | A-1-a | 0 | 0-40 | 40-68 | 12-45 | 5-25 | 1-5 | 0-16 | NP-1 |
| 106D: | Riverside | | | | | | | | | | | |
| | 0-7 | Cobbly loamy loam | CL-ML, SC-SM | A-4 | 0 | 15-30 | 84-94 | 70-80 | 55-75 | 30-60 | 23-28 | 4-9 |
| | 7-12 | Cobbly sandy loam, Gravely sandy loam, Very gravely sandy loam | GM, SC-SM, SM | A-1-b, A-2 | 0 | 0-28 | 58-90 | 37-40 | 20-50 | 10-30 | 18-25 | 2-7 |
| | 12-25 | Very cobbly loamy sand. Very gravelly loamy coarse sand, Very gravelly loamy sand | GW-GM, SM-SM, SW-SM | A-1-a | 0 | 0-40 | 52-75 | 32-55 | 10-40 | 5-15 | 0-17 | NP-1 |
| | 25-60 | Very cobbly loamy sand, Very gravelly sand, Extremely gravelly coarse sand | GW, GW-GM | A-1-a | 0 | 0-40 | 40-68 | 12-45 | 5-25 | 1-5 | 0-16 | NP-1 |

This report shows only the major soils in each map unit. Others may exist.

Engineering Properties

Bitterroot Valley Area, Montana

| Map symbol and soil name | Depth <i>h</i> | USDA texture | Classification | | Fragments | | Percent passing sieve number-- | | | Liquid limit | Plasticity index |
|-----------------------------|-------------------|--|---------------------------|---------------|---------------|----------------|--------------------------------|-------|-------|-----------------|---------------------|
| | | | Unified | AASHTO | >10 Inches | 3-10 Inches | 4 | 10 | 40 | | |
| 106E: | | | | | | | | | | | |
| Riverside | 0-7 | Cobbly sandy loam | CL-ML, SC-SM | A-4 | 0 | 15-30 | 84-94 | 70-90 | 55-75 | 30-60 | 23-28 |
| | 7-12 | Cobbly sandy loam, Gravely sandy loam, Very gravelly sandy loam | GM, SC-SM, SM | A-1-b, A-2 | 0 | 0-28 | 58-90 | 37-80 | 20-50 | 10-30 | 18-25 |
| | 12-25 | Very cobbly loamy sand, Very gravelly loamy coarse sand, Very gravelly loamy sand | GW-GM, SW-SM, SM-SM | A-1-a | 0 | 0-40 | 52-75 | 32-55 | 10-40 | 5-15 | 0-17 |
| | 25-60 | Very cobbly loamy sand, Very gravelly sand, Extremely gravelly coarse sand | GW, GW-GM | A-1-a | 0 | 0-40 | 40-88 | 12-45 | 5-25 | 1-5 | 0-16 |
| 108C: | | | | | | | | | | | |
| Riverside | 0-7 | Gravelly sandy loam | SC-SM | A-1, A-2-4 | 0 | 0-15 | 73-96 | 55-75 | 35-55 | 15-30 | 21-28 |
| | 7-12 | Cobbly sandy loam, Gravelly sandy loam, Very gravelly sandy loam | GM, SC-SM, SM | A-1-b, A-2 | 0 | 0-28 | 58-90 | 37-80 | 20-50 | 10-30 | 18-25 |
| | 12-25 | Very gravelly loamy sand, Very gravelly loamy coarse sand, Very gravelly loamy sand | GM-GM, SW-SM | A-1-a | 0 | 0-40 | 52-75 | 32-55 | 10-40 | 5-15 | 0-17 |
| | 25-60 | Very cobbly loamy sand, Very gravelly sand, Extremely gravelly coarse sand | GW, GW-GM | A-1-a | 0 | 0-40 | 40-88 | 12-45 | 5-25 | 1-5 | 0-16 |

The report shows only the major soils in each map unit. Others may exist.

Engineering Properties

Bitterroot Valley Area, Montana

| Map symbol and soil name | Depth <i>in</i> | USDA texture | Classification | | Fragments | | Percent passing sieve number— | | | Liquid limit | Plasticity index | |
|-----------------------------|--------------------|---|---------------------|-----------------|---------------|----------------|-------------------------------|-------|-------|-----------------|---------------------|------|
| | | | Unified | AASHTO | >10 Inches | 3-10 Inches | 4 | 10 | 40 | | | |
| 100E: Riverside | 0-7 | Gravelly sandy loam | SC-SM | A-1, A-2-4 | 0 | 0-15 | 73-98 | 55-75 | 35-55 | 15-30 | 21-28 | 4-9 |
| | 7-12 | Cobbly sandy loam, Very gravelly sandy loam, Very gravelly sandy loam | GM, SC-SM, SM | A-1-b, A-2 | 0 | 0-28 | 58-80 | 37-80 | 20-50 | 10-30 | 18-25 | 2-7 |
| | 12-25 | Very cobbly loamy sand, Very gravelly loamy coarse sand, Very gravelly loamy sand | GW-GM, SW-SM | A-1-a | 0 | 0-40 | 52-75 | 32-55 | 10-40 | 5-15 | 0-17 | NP-1 |
| | 25-50 | Very gravelly loamy sand, Very gravelly sand, Extremely gravelly coarse sand | GW, GW-GM | A-1-a | 0 | 0-40 | 40-68 | 12-45 | 5-25 | 1-5 | 0-16 | NP-1 |
| 170E: Penna | 0-10 | Cobbly sandy loam | SC-SM | A-2-4 | 0 | 15-30 | 83-95 | 74-90 | 45-65 | 25-35 | 21-28 | 4-9 |
| | 10-16 | Very gravelly loam, Very gravelly sandy loam | GC-GM, SC | A-1, A-2-4 | 0 | 0-25 | 53-73 | 35-55 | 25-50 | 10-40 | 21-30 | 4-11 |
| | 16-30 | Very cobbly sandy loam, Very gravelly sandy loam | GW, SC-SM | A-1-b, A-2-4 | 0 | 10-40 | 60-77 | 45-65 | 25-45 | 15-25 | 16-26 | 2-8 |
| | 30-60 | Very cobbly loamy coarse sand, Very gravelly coarse sand, Very gravelly sand, Extremely gravelly sand | GW-GM, SP-SM | A-1-a | 0 | 15-50 | 45-70 | 25-58 | 10-35 | 0-10 | 0-18 | NP-2 |

This report shows only the major soils in each map unit. Others may exist.



Tabular Data Version: 3
Tabular Data Version Date: 04/25/2006

Engineering Properties

Bitterroot Valley Area, Montana

| Map symbol and soil name | Depth <i>In</i> | USDA texture | Classification | | Fragments | | Percent passing sieve number-- | | | | Liquid limit | Plasticity index |
|-----------------------------|--------------------|--|---------------------------|---------------|---------------|----------------|--------------------------------|--------|--------|-------|--------------|------------------|
| | | | Unified | AASHTO | >10 Inches | 3-10 Inches | 4 | 10 | 40 | 200 | | |
| 179E: | | | | | | | | | | | | |
| Riverside | 0-7 | Cobbly sandy loam | CL-ML, SC-SM | A-4 | 0 | 15-30 | 84-94 | 70-90 | 55-75 | 30-60 | 23-28 | 4-9 |
| | 7-12 | Cobbly sandy loam, Gravely sandy loam, Very gravelly sandy loam | GM, SC-SM, SM | A-1-b, A-2 | 0 | 0-28 | 58-90 | 37-60 | 20-50 | 10-30 | 16-25 | 2-7 |
| | 12-25 | Very cobbly loamy sand, Very gravelly heavy coarse sand, Very gravelly loamy sand | GW-GM, SW-SM, SW-SM | A-1-a | 0 | 0-40 | 52-75 | 32-55 | 10-40 | 5-15 | 0-17 | NP-1 |
| | 25-60 | Very gravelly loamy sand, Extremely gravelly coarse sand | GW, GW-GM | A-1-a | 0 | 0-40 | 40-68 | 12-45 | 5-25 | 1-5 | 0-18 | NP-1 |
| 180B: | | | | | | | | | | | | |
| Farmuf | 0-8 | Loam | CL | A-4, A-6 | 0 | 0-15 | 92-100 | 85-100 | 70-95 | 60-75 | 26-34 | 8-14 |
| | 8-18 | Clay loam, Loam, Sandy clay loam | CL | A-5, A-7 | 0 | 0-15 | 92-100 | 85-100 | 70-85 | 45-75 | 34-44 | 14-22 |
| | 18-34 | Fine sandy loam, Loam | CL SC-SM | A-4, A-6 | 0 | 0-10 | 88-100 | 80-100 | 60-80 | 35-70 | 25-34 | 7-14 |
| | 34-60 | Fine sandy loam, Gravely sandy loam | SC-SM, SM | A-2-a, A-4 | 0 | 0-10 | 72-100 | 60-100 | 35-85 | 20-55 | 18-26 | 2-8 |
| Hacke | 0-6 | Loam | CL | A-4, A-6 | 0 | 0-15 | 98-100 | 85-100 | 70-85 | 60-75 | 26-34 | 8-14 |
| | 6-15 | Silty clay loam, Silt loam | CL | A-5, A-7 | 0 | 0 | 98-100 | 91-100 | 80-100 | 70-83 | 32-48 | 12-25 |
| | 15-28 | Loam, Silt loam | CL | A-5 | 0 | 0 | 98-100 | 90-100 | 85-95 | 70-85 | 26-38 | 10-17 |
| | 28-48 | Loam, Silt loam | CL CL-ML | A-4, A-6 | 0 | 0-10 | 91-100 | 85-100 | 75-95 | 55-85 | 22-32 | 7-13 |
| | 48-60 | Fine sandy loam, Gravelly fine sandy loam | SC, SC-SM | A-4, A-6 | 0 | 0-10 | 78-100 | 70-100 | 50-80 | 30-65 | 22-32 | 7-13 |

This report shows only the major soils in each map unit. Others may exist.

Engineering Properties

Bitterroot Valley Area, Montana

| Map symbol and soil name | Depth <i>m</i> | USDA texture | Classification | | Fragments | | Percent passing sieve number— | | | Liquid limit | Plasticity index | |
|-----------------------------|-------------------|---|-------------------------|---------------|----------------|----------------|-------------------------------|--------|--------|-----------------|---------------------|-------|
| | | | Unified | AASHTO | > 10 Inches | 3-10 Inches | 4 | 10 | 40 | | | |
| 180C: | | | | | | | | | | | | |
| Farmuf | | | | | | | | | | | | |
| | 0-8 | Loam | CL | A-4, A-5 | 0 | 0-15 | 92-100 | 85-100 | 70-85 | 60-75 | 26-34 | 8-14 |
| | 8-16 | Clay loam, Loam, Sandy clay loam | CL | A-5, A-7 | 0 | 0-15 | 92-100 | 85-100 | 70-85 | 45-75 | 34-44 | 14-22 |
| | 18-34 | Fine sandy loam, Loam | CL, SC-SM | A-4, A-6 | 0 | 0-10 | 88-100 | 86-100 | 60-90 | 35-70 | 25-34 | 7-14 |
| | 34-50 | Fine sandy loam, Gravelly sandy loam | SC-SM, SM | A-2-4, A-4 | 0 | 0-10 | 72-100 | 60-100 | 35-85 | 20-55 | 18-28 | 2-8 |
| Hacke | | | | | | | | | | | | |
| | 0-6 | Loam | CL | A-4, A-5 | 0 | 0-15 | 98-100 | 85-100 | 70-95 | 60-75 | 26-34 | 8-14 |
| | 6-15 | Silty clay loam, Silt loam | CL | A-5, A-7 | 0 | 0 | 98-100 | 91-100 | 80-100 | 70-93 | 32-48 | 12-25 |
| | 15-28 | Loam, Silt loam | CL | A-6 | 0 | 0 | 86-100 | 90-100 | 85-85 | 70-85 | 26-38 | 10-17 |
| | 28-48 | Loam, Silt loam | CL, CL-ML | A-4, A-6 | 0 | 0-10 | 91-100 | 85-100 | 75-95 | 55-85 | 22-32 | 7-13 |
| | 48-50 | Fine sandy loam, Gravelly fine sandy loam | SC, SC-SM | A-4, A-5 | 0 | 0-10 | 78-100 | 70-100 | 50-80 | 30-55 | 22-32 | 7-13 |
| 182D: | | | | | | | | | | | | |
| Quast | | | | | | | | | | | | |
| | 0-12 | Loam | CL | A-4, A-5 | 0 | 0-15 | 92-100 | 85-100 | 70-85 | 60-75 | 26-34 | 8-14 |
| | 12-25 | Silt loam | CL, CL-ML | A-4, A-5 | 0 | 0 | 98-100 | 85-100 | 85-100 | 60-90 | 24-35 | 7-13 |
| | 25-35 | Silt loam, Very fine sandy loam | CL, CL-ML | A-4 | 0 | 0 | 95-100 | 80-100 | 75-100 | 50-65 | 20-32 | 6-13 |
| | 35-60 | Fine sandy loam, Silt loam, Very fine sandy loam | CL, CL-ML, SC-SCM | A-4 | 0 | 0 | 87-100 | 80-100 | 70-98 | 45-85 | 18-30 | 4-12 |

This report shows only the major soils in each map unit. Others may exist.

Engineering Properties

Bitterroot Valley Area, Montana

| Map symbol and soil name | Depth <i>m</i> | USDA texture | Classification | | Fragments | | Percent passing sieve number— | | | | Liquid limit | Plasticity index |
|-----------------------------|-------------------|--|----------------|----------------------------|----------------|----------------|-------------------------------|--------|--------|-------|-----------------|---------------------|
| | | | Unified | AASHTO | > 10 Inches | 3-10 Inches | 4 | 10 | 40 | 200 | | |
| 18BD: Huckle | | | | | | | Pct | Pct | Pct | Pct | | |
| | 0-5 | Loam | CL | A-4, A-6 | 0 | 0-15 | 98-100 | 85-100 | 70-95 | 60-75 | 26-34 | 8-14 |
| | 6-15 | Silty clay loam, Silt loam | CL | A-6, A-7 | 0 | 0 | 98-100 | 91-100 | 80-100 | 70-93 | 32-48 | 12-25 |
| | 15-26 | Loam, Silt loam | CL | A-6 | 0 | 0 | 98-100 | 90-100 | 85-95 | 70-85 | 26-38 | 10-17 |
| | 28-48 | Loam, Silt loam | CL | A-4 | 0 | 0-10 | 91-100 | 85-100 | 75-85 | 55-85 | 22-32 | 7-13 |
| | 48-60 | Fine sandy loam, Gravelly fine sandy loam | SC, SC-SM | CL-ML A-6 A-4 A-8 | 0 | 0-10 | 76-100 | 70-100 | 50-80 | 30-55 | 22-32 | 7-13 |

This report shows only the major soils in each map unit. Others may exist.